2) Учёт индивидуальных особенностей по интерактивному влиянию и правильному подбору методов и их внедрению;

3) Заблаговременное чувство отношений между учителем и учеником.

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FORMING THE INTELLIGENCE OF FUTURE PRIMARY SCHOOL TEACHERS BASED ON CRITICAL THINKING

Shayakhmetova Dana Beksultanovna
Candidate of pedagogical sciences, Associate professor
Department of foreign languages
Abay Kazakh National Pedagogical University
Almaty, Republic of Kazakhstan

ABSTRACT

This article is devoted to the problem of forming the intelligence of future primary school teachers based on the use of critical thinking techniques. The study clarified the concept of "intellectuality" as a set of methods, techniques, tools and mechanisms of training, as well as recommendations for their use in connection with the critical thinking acquisition, stimulating the formation of intellectual skills. The stages (challenge, implementation, reflection) that characterize critical thinking development are analyzed, their influence in the formation of intellectual skills of the future primary school teacher is established. Criteria and indicators for the formation of students' intellectual skills were developed: cognitive criteria - awareness of the purpose and order of performing mental actions, productivity of mental activity, success in learning knowledge; perceptual criterion - the degree of perception of educational information, the formation of positive qualities of the mind, the search for new ways of thinking; activity criteria - compliance with the sequence of mental actions, the breadth of transfer of intellectual decisions, independence in performing mental actions, the frequency of application of intellectual skills in educational activities, as well as the levels of formation of intellectual skills allocated on their basis: critical, reproductive, heuristic, creative.

Key words: intellectuality, intellectual skills, mental operations, critical thinking development technology, stages, challenge, implementation, reflection, criteria and indicators, experiment.

1.INTRODUCTION

Among the various directions of improving the education system in modern conditions, the most important is the use of innovative pedagogical technologies in teaching, which are quite consistent with the strategic line of personal and activity approaches, focused on the real provision of personal activity, setting on a specific expected result, "building" a technological chain of actions, operations, the relationship between the teacher and the student, taking into account the principles of individualization and differentiation, optimal implementation of human and technical potential. Unfortunately, in national pedagogy of higher education, studies devoted to the theoretical understanding of this serious problem are insufficiently presented, which would substantiate the effective use of pedagogical technologies in the educational process, determine the pedagogical conditions for the implementation critical thinking technology in the context of the formation of students' intellectual skills.

The need to introduce pedagogical technologies in the educational process of higher education is emphasized in the works of prominent Russian scientists who study the problems of higher school didactics. So, S.I. Arkhangelsky considers that it necessary to include in the educational process a system of active technologies, A. A. Verbitsky analyzes pedagogical technologies in the context of a contextual approach, G. K. Selevko offers a system of various technologies, D. V. Chernilevsky analyzes active learning technologies, considering their availability with high-quality information and subject resources, N. A. Moreva reveals the potential of active technologies as the basis of innovative activity, V. A. Slastenin, considering the technologies of the integral pedagogical process, pays attention to their essential features. Important for our research are the works of A.V. Korzhuev, V. A. Popkov, S. D. Smirnov, T. I. Shamova and other scientists who offer the basics of scientific design and application that guarantee the success of pedagogical actions. Meanwhile, there are almost no works in which there would be ways to use the technology of critical thinking development in the educational process of the university, and, above all, in connection with the formation of students' intellectual skills, form the basis of logical thinking and determine the success of the analysis, synthesis, comparison, generalization, etc.

Qualitative transformation of logical thinking operations ensures the development of professionally significant skills: to make rational decisions, to search for non-standard methods of overcoming problems, to choose the best ways of activity. This, in turn, contributes to the formation of innovative thinking, the formation of key competencies, which is especially important in the context of the transition to level training of a specialist.

The formation of generalized ways of thinking activity characterizes the intellectual status of the

individual, indicates the ability to adequately assess the actions taken and offer original ways to solve problems.

The issue of forming intellectual skills is fully considered in the scientific literature: a general theoretical Foundation has been developed in the works of B. G. Ananiev, K. K. Platonov, and S. L. Rubinstein, L.Vigotsky, V. Bloom, J. Piaget, D. Taylor, J. Feldhusen, etc.

However, the question of the possibility of using pedagogical technologies in the context of the formation of intellectual skills of students remains insufficiently studied.

Of particular interest in this regard is the potential of the technology for developing critical thinking, which includes a set of technological techniques and mechanisms aimed at activating students' mental activity, stimulating search activity, organizing reflection, and mastering critical thinking skills.

Thus, the relevance of the article is due to the need to resolve contradictions between:

an objective increase in the role of subjects' activity in the educational process and the insufficient use of innovative technologies in education;

understanding the fundamental importance of intellectual development of students and insufficient development of pedagogical conditions, technologies and mechanisms for the qualitative transformation of their mental abilities;

the need for students to assimilate large amounts of educational information and difficulties in processing it, transforming it into knowledge, and effectively using it in real life.

The revealed contradictions determined the scientific problem: what are the psychological and pedagogical conditions for the effective formation of the future primary school teacher's intelligence in the process of implementing the technology for developing critical thinking?

The relevance of the problem and its great practical significance allowed us to determine the topic of the study: “Developing the intelligence of future primary school teachers based on critical thinking”.

The purpose of the article: to theoretically justify and experimentally test the set of psychological and pedagogical conditions for the effective formation of the intelligence of the future primary school teacher.

In accordance with the goal, the following research **objectives** were formulated:

to clarify the essence, algorithm and techniques of critical thinking technology in the context of intellectual development of the individual.

to develop and experimentally test an algorithm for the formation of intellectual skills by means of critical thinking development technology that activates mental activity.

to identify a set of psychological and pedagogical conditions that ensure the effectiveness of the use of critical thinking development technologies in the formation of intellectual skills of the future primary school teacher.

to reveal the specifics of the implementation of critical thinking development technology in the didactic process of higher education.

MATERIAL AND METHODS

One of the key tasks of the educational process is to ensure the mental development of the individual, who is due to the social order requires training of students who are able to navigate the growing flow of information, to accept rational solutions, creatively solve the problems. These qualities can be developed in the process of forming intellectual skills that are positioned in psychological and pedagogical science as a component of thinking and one of the most reliable criteria for the mental development of the individual. Therefore, the learning process, focused on the formation of intellectual skills, allows you to build strategic lines of influence both on the thinking process and on the mental development of the individual as a whole. Determining mental development, primarily as positive changes in intellectual activity, occurring under the influence of learning (E.N. Kabanova-Meller, S.I. Kalmykova, N.A. Menchinskaya), researchers rightly believe that this concept needs to be seen in a broad and narrow sense [1-3]. Thus, when considering the concept of "mental development" in a broad sense, it can include in addition to the development of thinking, the development of attention, memory, motives, etc.

The variety of interpretations of the concept of "intellectual skills", however, does not affect its essence: scientists associate intellectual skills, first of all, with the possibility of performing mental operations, which are components of human thinking.

For successful acquisition of intellectual skills, it is extremely important that the implementation of intellectual skills is carried out with full awareness of both the task set for students and the ways to solve it. Awareness of tasks and methods for solving them is of fundamental importance in the formation of intellectual skills, since in this case there is always an element of creativity, and not just action according to the “pattern”.

The next significant feature of intellectual skills is their generalized nature, which determines mastery of the ways applicable in different areas of activity and in relation to different content (the breadth of the transfer of intellectual skills to other areas) that make it much easier to assimilate the learning material and provides a wide transfer of knowledge and ways of operating it on new material.

Based on intellectual skills, it is possible to clarify the definition of "**intellectuality**", which is a method of activity based on the successful execution of mental operations, due to the need for these operations, carried out with full awareness of the task and ways to solve it.

Formation of intellectual skills depends on the successful mastery of thought operations, the emergence of motivation associated with the appearance of students’ interest in the content of the knowledge obtained and how to acquire it, awareness of intellectual skills in solving problems, the generalized nature of intellectual skills, which indicates the breadth of transfer of these methods of activity in solving various tasks.

Intellectual skills are a component of mental development, forming an important part of its structure

along with learning and the foundation of effective knowledge. In this regard, intellectual skills can influence other components of the mental development of the individual, transforming the properties of thinking, contributing to the effective assimilation of knowledge.

The acquisition of intellectual skills should be carried out taking into account the physiological and psychological aspects of their formation, which is quite achievable as a result of the use of critical thinking development technology in the didactic process, which is able to ensure the effective assimilation of students' methods of mental activity and significantly increase the level of mental development of the individual.

Focusing to physiological and psychological characteristics will allow the teacher to more competently work on the formation of generalized ways of thinking: to focus on the relationship of intellectual skills and thinking abilities, to select the right means to activate intellectual activity in general.

At present, in the conditions of modernization of higher professional education, along with the classic tasks of mastering a set of basic competencies necessary for future professional activities, the most urgent problem is the formation of skills that provide the ability to think independently, make rational decisions, and achieve goals, the mastery of which will ensure the formation of innovative thinking in future specialists.

In this regard, the introduction of pedagogical technologies in the educational process, providing creative solutions to the problems and the predominance of the search activities of students, becomes especially relevant.

In our opinion, a special place in the system of pedagogical technologies of higher education is occupied by the **technology of** developing **critical thinking** [8, 9, 10, 11, 12]. This pedagogical technology combines the advantages of adaptive technologies, personal and professional growth and intellectual orientation. Its adaptive potential is a pronounced dialogical component that allows you to organize communication between the subjects of the educational process, involves the presentation of all points of view on the issues raised and requires respect to the position of opponents.

The technology of critical thinking development makes it possible to organize the educational process clearly, significantly increase interest in the material being studied, develop the ability to process information independently and increase the efficiency of its perception, form communicative and teamwork skills.

The basis of the technology for developing critical thinking is a three-phase model of information assimilation, which includes the stages of challenge, comprehension, and reflection.

Designing the learning process in the mode of technology for the development of critical thinking allows students to independently determine the purpose of teaching, to carry out productive work with educational material and reflect on the knowledge gained and how to acquire it. At the stage of challenge, students ' minds are updated with knowledge and ideas about the subject of study.

Table 1.

Characteristics of the stages of critical thinking development technology

Stage	The characteristic of stage	Teacher's functions	Students' functions
Challenge	updating of knowledge and ideas about the subject of study in the minds of students; formation of cognitive interest; defining the purpose of further training activities; activization of students, aimed at updating their own experience; systematization of information on the subject under study.	to provide students with the opportunity to Express their point of view about the topic being studied freely, without fear of making mistakes and being corrected by the teacher; to record all statements: any of them will be important for further work. At this stage, there are no "correct" or "incorrect" statements; to combine individual and group work. to encourage students to remember what they already know about the topic under study, promote a conflict-free exchange of views in groups, and record and systematize information received from participants.	to develop self-confidence and understanding of the value of opinions and ideas; actively participate in the educational process; to listen to different opinions with respect; be prepared to both formulate own judgments and refrain from them.

Understanding (implementation)	getting in touch with new information, systematizing information, and correlating it with own knowledge; independent monitoring of the effectiveness of the educational process; self-designing of learning objectives by students.	to maintain the activity of students, their interest during the phase of challenge; to encourage students to ask new questions, to find answers through the context of the information they work with; try to compare this information with existing knowledge and experience.	focus on finding answers to previously encountered questions and difficulties; pay attention to ambiguities, trying to raise new questions; try to track the process of acquaintance with new information, pay attention to what attracts the students, which aspects are less interesting and why; analyze and discuss what you have heard or read.
Reflection	holistic understanding, assignment and generalization of the information received; developing own attitude to the material being studied, identifying what is not yet known (a new challenge); analysis of the educational process as a whole.	to make changes and additions; to provide a creative research tasks on the basis of the information received; to correlate "new" information with "old" information, using the knowledge gained at the stage of understanding (implementation); creatively process the received information.	to master the different ways of integrating information; to learn to develop own opinion based on the understanding of various experiences, make conclusions and logical chains of evidence, express thoughts clearly, confidently and correctly in relation to others.

In a combination of individual and group work, cognitive interest is formed, the goals of further educational activities are determined, and the activity of students increases. They are given the opportunity to independently analyze the existing ideas, which creates an additional incentive for students to formulate their own goals and motives.

Another task of the stage of challenge is the activation of students, therefore, it is necessary that each student can take part in work aimed at updating the subjective experience. The most important thing in the process of implementing the challenge is to systematize all the information obtained as a result of free statements of students. This will allow them, on the one hand, to see the collected information in an enlarged, categorical form, on the other hand, structuring the opinions expressed will reveal contradictions, which will determine the direction of further search during the study of new information. These directions can be individual for each student. The student determines independently on which aspect of the topic he should focus his attention, and which information requires only verification for reliability.

C. Temple, J. Steele, K. Meredith identified the necessary conditions that will contribute to the development of students' critical thinking: providing time and opportunities for acquiring critical thinking experience; creating a favorable environment for reflection; accepting different opinions and ideas; promoting students' activity in the educational process; and appreciating the manifestations of critical thinking [8, p. 8].

In case of successful fulfillment of the challenge stage, students have a powerful incentive to work at the next stage - getting new information, which is carried out at the stage of understanding (implementation). Students systematize information, correlating it with their own knowledge, use technological techniques to track the effectiveness of the educational process, and continue to actively design the goals of the teaching. Setting goals in the process of getting acquainted with new information is carried out when it is projected on existing knowledge. At this stage, students can get answers to questions posed during the challenge, but not all questions and difficulties can be resolved. In this case, it is important that the teacher encourages students to pose new questions, search for answers through the context of the information they are working with. The authors of the pedagogical technology for the development of critical thinking suggest allocating sufficient time for the implementation of this stage. If the students are working with the text, it is advisable to organize a second reading, because to clarify the assumptions it is often necessary to return to the text in a "new round" of perception.

At the stage of reflection, there is a holistic understanding, assignment and generalization of the information received, a new challenge is carried out (identification of new issues), and the choice of optimal ways to solve problems.

Intellectuality, formed on the basis of intellectual skills, is manifested at the physiological, psychological, and pedagogical levels. However, there are a number of conditions, compliance with which will contribute to the effective formation of intelligence in the future primary school teacher in the process of implementing the technology for developing critical thinking.

In the process of implementing the "*Peer brainstorming*" technique, a couple of students make a list of what they know about a given topic or determine

the range of questions they are interested in. This strategy allows you to accurately measure the time of work with the task, gives each student the opportunity to express their opinion on the problem and understand it first independently, and then in pairs, facilitates the establishment of contact with the audience.

"*Group brainstorming*" allows you to listen to different opinions and views on the issue under study, promotes discussion.

In the course of applying the "*Mutual Poll*" technique, the detailed processing of the educational material takes place, through careful study of the text, which helps to increase attention and stimulates learning motivation.

"*Mix logical chains*" are used in the group. The teacher writes individual events from the chronological or cause-and-effect chain. Each event is placed on a separate sheet. The group is asked to restore the correct order.

The implementation of this technique contributes to the emergence of a discussion, effective memorization of information, creates situations of intellectual difficulty, trains logical thinking, requires the inclusion of the entire audience in the work and expressing own opinions when solving the task.

"*Development for independent training*" helps to direct the research activities of students, focus their attention on the details. This technique allows to organize a group discussion, develop critical thinking, promotes discussion, creates problem-solving situations, etc.

"*Joint search*", provides the emergence of a discussion, allows the teacher to update the problem field, outline ways to solve complex problems, etc.

"*Breakdown into clusters (blocks of ideas)*" is used to systematize the acquired knowledge, clear structuring and generalization of the acquired information, helps to establish a "feedback" with each student.

The "*marking table*" contributes to the formation of the ability to classify, systematize and generalize information, creates conditions for constructive interpretation of the received information, etc.

"*Think independently (in pairs / per audience)*" creates situations of intellectual difficulty, facilitates the organization of discussion communication.

Techniques *"Text Labeling System I.N.S.E.R.T." and "We Know - We Want to Know – Learned"* trains the skill of formulating the question, the ability to classify, draw conclusions, analyze and systematize the information received, organize meaningful reflection and setting meaningful goals for the future, etc.

"*Mutual learning*" allows to be in the role of a teacher, creates situations of intellectual difficulty, activates group work.

The "*concept table*" is used when comparing effectively two or more objects, promotes the development of the ability to identify comparison criteria and conduct comparative analysis of objects; organizes reflexive interpretation of the text.

"*The logbook*" trains the ability to formulate theses and questions, find and formulate problems, draws up a generalized view of students on the entire content of the lesson.

"*Ten-minute essay*" and other free written tasks develop the ability to formulate and express own thoughts, create situations of intellectual difficulty, develop the ability to highlight the main thing, etc.

The "*output card*" is used when summarizing the results of the lesson. It trains the ability to find and formulate a problem, independently determine further meaningful moves, allows students to keep their attention throughout the reading, classify information depending on their own experience and knowledge, and organize a group discussion of the topic.

"*Sinkwain*" develops the ability to search for and find the most appropriate, accurate and concise words to express one's thoughts; it allows to "hold" and reproduce the content of the lesson in an artistic (personal', creative) form.

The zigzag technique organizes the process of self-learning and mutual learning, gives students the opportunity to work in different groups and participate in various events; it uses all methods of obtaining new information (reading, listening, discussing, creative interpretation), etc.

The "cross-discussion" allows a clear and dynamic discussion of the problem, is a good factor in motivating students to further developing of the issue.

Activation of students' mental activity can be provided by creating problem-solving, *insight* technique, heuristic methods.

Insight - a psychological state in which there is a disinhibition of thinking, which is the cause of manifestation in the memory of metaphorical formations and stimulates the subconscious to the manifestation of creative intuition.

The phenomenon of "insight" is widely used in brainstorming (brain attack) and the method of synectics, when students are invited to express all their ideas, and then selected the most appropriate solution to the specified problem.

The solution of heuristic problems is based on sifting out possible ways to solve the problem and select the most appropriate ones. The solution is performed by putting forward a hypothesis that often occurs on an intuitive basis. The hypothesis allows to establish missing logical connections, generalize the available information, and identify cause-and-effect relationships hidden in the problem condition.

A heuristic conversation involves performing a heuristic search. The most common methods of heuristic search are the "*method of catalogue*" (based on finding analogues and transferring knowledge about an object from one subject area to another), "*method of garlands of randomness*" (based on finding an original solution through the formation of random combinations), the "*If method...*" (aimed at establishing cause-and-effect relationships between the studied phenomena and processes), "*method of multidimensional matrix*" (involves finding new, unexpected solutions by considering combinations of known and unknown elements), "*method of inversion*" (used in the event of inability to find a solution in the

traditional way and assumes the presence of opposite alternative solutions, etc.).

Analysis (solution) of pedagogical problems consists in quickly finding the correct way to solve the provided pedagogical situation. The following types of situations are distinguished: situations-illustrations, situations-exercises, situations-assessments, problem-solving situations [13].

In this part of the article, we have reviewed the creation of a special intellectual and developing environment, characterized by an atmosphere of mental tension, creative competition, search, critical evaluation and reflection

So, the methodological techniques at the stage of challenge are aimed at activating previously acquired knowledge on the topic, stimulating interest and setting goals for studying upcoming material. The use of techniques that are characteristic of the stage of thinking is possible after the students have asked specific questions and set goals. The techniques of this stage are aimed at systematizing the information received, correlating it with own knowledge. The techniques at the stage of reflection are focused on a detailed study of the material being studied: generalization, analysis, and correction of your own mistakes.

FINDINGS AND DISCUSSION

The formation of the intelligence of primary school teachers based on intellectual skills will be carried out most effectively as a result of the use of critical thinking in the didactic process.

For this purpose, the following experimental tasks were defined:

Identify the levels and criteria for the formation of students' intelligence.

Develop and test a didactic algorithm for implementing critical thinking in the process of forming intellectual skills.

Students of 1,2,3 courses in the specialty 5B010200-Pedagogy and methods of primary education of Abay Kazakh National pedagogical University and Almaty University (Kazakhstan) took part in experiment.

Initially, we developed criteria and indicators, as well as analyzed the relationship between levels and criteria for the formation of intelligence based on intellectual skills (Table 2).

Table 2.

Criteria and indicators of students' intellectuality development

The levels of development of intellectual skills	criteria and indicators		
	Cognitive	**Activity**	**Perceptive**
Critical	low awareness of the goal of thought activity;	parts of objects or signs of phenomena are not always listed in the correct sequence.	low level of perception of information to be assimilated;
	the order of performing mental operations is not observed;	violation of the order of performing mental operations;	insufficient formation of positive thinking qualities (activity, independence, productivity, depth of mind, flexibility of thinking).
	low productivity of mental activity.	absence of some stages of thought operations;	
		there are significant difficulties in moving to other thematic areas.	
Reproductive	average awareness of the purpose of intellectual activity;	parts of objects or signs of phenomena are listed in a certain sequence, but without the necessary subordination;	average level of perception of educational material;
	compliance with the order of execution of thought operations;	minor errors in the course of action may be made in the process of applying intellectual skill (often this error is stable);	in intellectual activity, positive thinking qualities predominate.
	average productivity of mental activity.	the transfer of intellectual skill is not always accurate; there are certain difficulties in the implementation of self-transfer (inherent activity "by template").	
Heuristic	high degree of awareness of the goal of mental activity;	active use of intellectual skills in educational activities;	comprehensive relationships between the studied phenomena are indicated;
	the order of execution of mental actions is observed;	active and broad transfer of intellectual skills to other thematic areas (there is a stable independence of the transfer of intellectual skills).	there is a search for new ways of thinking based on previous experience.
	high productivity of mental activity. active		

	use of intellectual skills in educational activities.		
Creative	high degree of awareness of goals and tasks of mental activity;	realized formed and firmly fixed intellectual skills;	there is an active search for new ways of thinking when solving tasks;
	high productivity of thinking and learning activities.	there is an independent development of hypotheses, discoveries, etc.;	high level of formation of positive properties of thinking.
		mental activity is aimed at "perspective".	

During the experiment, a diagnostic survey of the level of intellectuality formation in the experimental and control groups was carried out. The results obtained were subjected to statistical analysis. For this purpose, we have used mathematical statistics methods, namely the Pearson x^2 criterion, which can be used to compare frequency, for example, percentage distributions of data. We determined the x^2 criterion based on the levels of formation of intellectual skills to analyze-synthesize, compare, generalize, classify, systematize, establish cause-and-effect relationships in the experimental and control groups at the beginning and in the end of the experiment.

Table 3.

Determination of the x^2 criterion by the levels of formation of the skill *to analyze and synthesize* at the beginning and end of the experiment (experimental group)

Levels	Before experiment		After experiment	
	Number of students	%	Number of students	%
Creative	37	27	39	29
Heuristic	32	23	35	26
Reproductive	31	30	31	23
Critical	35	20	30	22
Total	135	100	135	100

Table 4.

Determination of the x^2 criterion by the levels of formation of the skill *to analyze and synthesize* at the beginning and end of the experiment (control group)

Levels	Before experiment		After experiment	
	Number of students	%	Number of students	%
Creative	20	16	24	18
Heuristic	43	33	46	35
Reproductive	37	28	40	30
Critical	32	24	22	17
Total	132	100	132	100

The data obtained indicate that in the control group the situation changed slightly compared to the pre-experimental test. In contrast, there are statistically significant differences in the experimental group. It follows that the level of formation of the intellectual skill to analyze-synthesis in the experimental group has changed in the direction of qualitative improvement.

Table 5.

Determination of the x^2 criterion by the levels of formation of the skill *to compare* at the beginning and end of the experiment (experimental group)

Levels	Before experiment		After experiment	
	Number of students	%	Number of students	%
Creative	24	18	25	19
Heuristic	45	33	35	26
Reproductive	32	24	34	25
Critical	34	25	41	30
Total	135	100	135	100

Table 6.

Determination of the x^2 criterion by the levels of formation of the skill *to compare* at the beginning and end of the experiment (control group)

Levels	Before experiment		After experiment	
	Number of students	%	Number of students	%
Creative	23	17	20	15
Heuristic	44	32	42	32
Reproductive	30	23	31	23
Critical	38	28	39	30
Total	132	100	132	100

The table shows that in the control group, the level of formed intellectual skill to compare has undergone minor changes. In contrast, there are statistically significant differences in the experimental group. This allows us to note the positive dynamics of the formation of the intellectual skill to compare in the experimental group.

Table 7.

Determination of the x^2 criterion by the levels of formation of the skill *to generalize* at the beginning and end of the experiment (experimental group)

Levels	Before experiment		After experiment	
	Number of students	%	Number of students	%
Creative	34	25	34	25
Heuristic	32	24	35	26
Reproductive	33	24	36	27
Critical	36	27	30	22
Total	135	100	135	100

Table 8.

Determination of the x^2 criterion by the levels of formation of the skill *to generalize* at the beginning and end of the experiment (control group)

Levels	Before experiment		After experiment	
	Number of students	%	Number of students	%
Creative	32	24	31	23
Heuristic	32	24	31	23
Reproductive	33	25	35	27
Critical	35	27	35	27
Total	132	100	132	100

The data obtained indicate that in the control group there was no positive dynamics in the diagnosed intellectual skill to generalize. In the experimental group, on the contrary, positive dynamics were noted.

Table 9.

Determination of the x^2 criterion by the levels of formation of the skill *to classify* at the beginning and end of the experiment (experimental group)

Levels	Before experiment		After experiment	
	Number of students	%	Number of students	%
Creative	31	23	32	24
Heuristic	35	26	33	24
Reproductive	34	25	35	26
Critical	35	26	35	26
Total	135	100	135	100

Table 10.

Determination of the x^2 criterion by the levels of formation of the skill *to classify* at the beginning and end of the experiment (control group)

Levels	Before experiment		After experiment	
	Number of students	%	Number of students	%
Creative	25	19	32	24
Heuristic	39	29	40	30
Reproductive	35	27	30	23
Critical	33	25	30	23
Total	132	100	132	100

The data in the table indicate that the level of formation of the intellectual skill to classify in the control group has not changed. The obtained values allow us to talk about positive changes in the level of formation of the skill to classify in the experimental group.

Table 11.

Determination of the x^2 criterion by the levels of formation of the skill *to systematize* at the beginning and end of the experiment (experimental group)

Levels	Before experiment		After experiment	
	Number of students	%	Number of students	%
Creative	27	20	27	20
Heuristic	27	20	30	22
Reproductive	41	30	43	32
Critical	40	30	35	26
Total	135	100	135	100

Table 12.

Determination of the x^2 criterion by the levels of formation of the skill *to systematize* at the beginning and end of the experiment (control group)

Levels	Before experiment		After experiment	
	Number of students	%	Number of students	%
Creative	22	17	23	17
Heuristic	25	18	25	19
Reproductive	42	32	42	32
Critical	43	33	42	32
Total	132	100	132	100

The data in the table do not reflect significant qualitative changes in the level of formation of the intellectual skill to systematize in the control group. In the experimental group, on the contrary, there were statistically significant differences. It follows that the level of formation of intellectual skill to systematize in the experimental group has changed towards qualitative improvement.

Table 13.

Determination of the x^2 criterion by the levels of formation of the skill *to establish cause and effect relationships* at the beginning and end of the experiment (experimental group)

Levels	Before experiment		After experiment	
	Number of students	%	Number of students	%
Creative	23	17	23	17
Heuristic	18	13	24	18
Reproductive	46	34	46	34
Critical	48	36	49	36
Total	135	100	135	100

Table 14.

Determination of the x^2 criterion by the levels of formation of the skill *to establish cause and effect relationships* at the beginning and end of the experiment (control group)

Levels	Before experiment		After experiment	
	Number of students	%	Number of students	%
Creative	18	14	19	14
Heuristic	19	14	23	16
Reproductive	43	33	40	30
Critical	52	39	53	40
Total	132	100	132	100

The data presented in the table indicate that the level of formation of the intellectual skill to establish cause and effect relationships in the control group did not undergo significant changes. On the contrary, in the experimental group, statistical data showed significant positive changes in the level of formation of cause-and-effect relationships.

Thus, based on the data obtained in the course of theoretical and empirical research, the following levels of formation of students' intellectual skills can be identified: critical, reproductive, heuristic, and creative. The revealed levels of formation of intellectual skills were established on the basis of cognitive, activity and perceptual criteria and indicators.

In our opinion, the definition of criteria and indicators of the effectiveness in the formation of students' intellectual skills creates prerequisites for the development of the intellectual orientation of the educational process of higher education.

The results of the experimental work make it possible to assert that special attention to the intellectual skills of the future specialist is the basis for expanding his intellectual potential, which determines the quality of mental activity and further success of professional activity.

CONCLUSION

After analyzing the features of the introduction of critical thinking development techniques in the process of forming the intelligence of future teachers of primary classes, we came to the following conclusions:

Intellectual skills are a significant component of intelligence, are part of the structure of mental abilities and intellectual development. Being one of the reliable criteria for the mental development of a personality, intellectual skills indicate the intelligence of a person and are able to influence the main thought processes.

The specifics of the formation of intellectual skills of the future primary school teacher is associated with the need to analyze, compare, generalize phenomena and processes, establish cause-and-effect relationships between them, which requires special knowledge and a certain sequence of actions when performing operations.

The success of the formation of intellectual skills is due to the purposeful development of cognitive, perceptual, and activity subsystems of the individual, which is fully provided by the pedagogical techniques for the development of critical thinking, aimed at enhancing perception, activating students' activities, and developing their cognitive abilities.

Techniques for developing critical thinking contain developmental, reflexive, dialogue and training mechanisms. Developing components of critical thinking allow to organize activities in the form of creative and research tasks, form research skills and systemic thinking, self-search and learning skills, contribute to the realization of the creativity of learners.

The results of experimental work confirmed that the developed didactic algorithm (critical thinking techniques) is an effective means of forming intellectual skills. Positive dynamics of the influence of experimental learning on the mental development of students, their mastery of logical thinking operations, strengthening of positive thinking properties have been revealed.

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